

CLAIMS

I Claim:

1. In a control valve for controlling a water treatment apparatus, the improvement comprising:
 - a) a water usage turbine rotatably mounted within a water receiving chamber, said turbine including a plurality of vanes;
 - b) a nozzle assembly having first and second flow paths for directing water in an impinging relationship with blades of said turbine;
 - c) at least one of said flow paths including a fluid pressure responsive valve element for controlling fluid flow along its associated fluid path.
2. The improvement of claim 1, wherein said fluid pressure responsive valve element comprises a resiliently biased poppet.
3. The improvement of claim 2, wherein said poppet sealingly engageable with a seat defined by a housing forming part of said nozzle assembly.
4. The improvement of claim 3, wherein said poppet is responsive to a water induced pressure drop across said nozzle and is operative to open upon reaching a predetermined pressure drop to enable fluid flow along said one flow path.
5. The improvement of claim 3, wherein said seat is defined by the radiused entry surface that merges smoothly with a reverse radiused sealing surface that is sealingly engageable by said poppet.

6. The improvement of claim 5, wherein said seat is also defined by a reduced diameter portion sized to allow said poppet to disengage said seating surface and pass through said reduced diameter portion when a reverse pressure drop that exceeds a predetermined level is applied to said poppet.

7. The improvement of claim 5, wherein said poppet biased towards engagement with said sealing surface by a spring.

8. The improvement of claim 3, wherein said nozzle includes a plurality of vanes located in a throat defined by said housing, said vanes imparting flow direction to water flowing through the nozzle.

9. The improvement of claim 3, wherein said poppet is supported for reciprocating movement by bearing structure forming part of said housing.

10. The improvement of claim 1, wherein said other flow path includes a fixed orifice, said fixed orifice increasing the velocity of water flowing along said other flow path in order to impinge said blades of said turbine with greater effectiveness.

11. The improvement of claim 3, wherein said housing defines a sealing tongue which is engageable with structure in said control valve whereby a sealing interface is created while allowing said nozzle to be removably secured in said control valve.

12. The improvement of claim 11, wherein said nozzle further includes crush ribs for establishing a sealing interface between itself and housing structure forming part of said control valve.

13. A control valve for controlling a water treatment apparatus, comprising:

a) a water usage turbine rotatably mounted within a water receiving chamber, said turbine including a plurality of vanes;

b) a nozzle mounted within said housing for directing water toward said turbine, said nozzle including an inlet communicating with said water receiving chamber;

c) said nozzle defining a throat extending from said inlet and terminating in an arcuate outlet configured to conform to a periphery of said turbine; and,

d) a plurality of vanes in said throat of said nozzle, said vanes being spaced apart and oriented at predetermined angles with respect to said turbine, such that said vanes impart direction to water flowing through said nozzle, such that said water tends to impinge on turbine blades in a normal direction.

14. The control valve of claim 13, wherein each vane is positioned at an angle that is different from the angle at which the other vanes are positioned.

15. The control valve of claim 14, where each vane is arcuate in cross section.

16. The control valve of claim 15, where two sets of vanes are formed in said nozzle with a support plate separating each set.

17. The control valve of claim 16, wherein said housing further defines a blocking wall in order to reduce the size of said inlet.

18. The control valve of claim 17, wherein said housing defines an arcuate side surface forming part of said throat which also tends to impart direction to the flow of water through said nozzle and which is operative to encourage the water to flow in a direction that tends to strike the blades of the turbine with greater effectiveness.

19. The control valve of claim 13, wherein said housing defines a second flow path including a fixed orifice for directing water ejected by said nozzle toward said turbine.

20. The control valve of claim 13, further including a pressure drop responsive poppet piston mounted in said throat for controlling fluid flow along said throat, said poppet piston opening to permit flow along said throat when a pressure drop across said poppet exceeds a predetermined value.

21. The control valve of claim 13, wherein said vanes define channels through which water flows, said channels being selectively blockable in order to reduce the effective cross-section of said throat.

22. The control valve of claim 13 wherein said nozzle is replaceably held in said control valve and includes structure for providing sealing engagement with structure forming part of said housing.

23. The control valve of claim 22 wherein said structure comprises a notch in a dividing wall.